

PATENT ABSTRACTS OF JAPAN

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(54) SURFACE LIGHT EMITTER

(57)Abstract:

PROBLEM TO BE SOLVED: To efficiently guide a light made incident on a light transmission plate to the upper surface of the light transmission plate with a simple structure so as to increase upper surface luminance by forming a plurality of grooves in the upper or lower surface of the light transmission plate and gradually increasing the depths of the grooves toward a spot farther away from a light source.

SOLUTION: When a light source 3 is turned ON, a portion of a light emitted from the light source 3 and made incident on a light transmission plate 2 is directly supplied to an upper surface 22 and a lower surface 23 or a side face and reflected or emitted to the outside of the plate 2. A portion of the light made incident on the plate 2 is supplied directly or indirectly to a most shallow groove 41 nearest to the light source 3, a subsequent second most shallow groove 42 and a deepest groove 45 farthest from the light source, a part thereof are reflected upward in sequence and emitted from the upper surface 22 to the outside of the plate 2. Thus, the total reflection light quantity of the grooves 41 to 45 are made approximately uniform and the luminance of the upper surface of the plate 2 is made uniform.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the field photogenic organ which can be used for the back light of a drop etc.

[0002]

[Description of the Prior Art] The field photogenic organ used for the back light of a drop etc. arranges the light source constituted from a Light Emitting Diode etc. on the side of a transparent light guide plate, and is constituted. And in order to lead the light which carried out incidence to the light guide plate from the light source to the upper surface of a light guide plate, minute unevenness is formed in the inferior surface of tongue of a light guide plate by crimp processing etc. However, since [which is depended on such crimp processing etc. / being minute] light of the light source was not able to be enough reflected if uneven, the upper surface brightness of a light guide plate was not able to be raised enough.

[0003]

[Problem(s) to be Solved by the Invention] this invention makes it the main technical problems to lead efficiently the light which carried out incidence to the light guide plate to the upper surface of a light guide plate, and to raise the upper surface brightness of a light guide plate by easy composition.

[0004]

[Means for Solving the Problem] this invention forms two or more slots in the upper surface or the inferior surface of tongue of the aforementioned light guide plate in the field photogenic organ which consists of the light source arranged on the side of a light guide plate and this light guide plate, and this slot is characterized by the depth considering as the composition in which it increases as it keeps away from the aforementioned light source.

[0005]

[Embodiments of the Invention] The example of this invention is explained with reference to a drawing below. The field photogenic organ 1 is main-constituted by at least one side (anterior side 21) of a light guide plate 2 and this light guide plate 2 with the light source 3 which carried out confrontation arrangement.

[0006] A light guide plate 2 is constituted using the plate of the transparent resin made from an acrylic with sufficient light-transmission nature, for example, a product, and the flat-surface configuration is formed in a request configuration, for example, a rectangle, and a square of a use. Two or more slots 4 linearly prolonged in a longitudinal direction are formed in the inferior surface of tongue 23 of a light guide plate 2 so that it may increase gradually as the depth keeps away from the light source 3. each slots 41 and 42 and .. 45 has the predetermined inclination (before or after 45 degrees) to the inferior surface of tongue 23 so that the light of the light source 3 may be reflected in the upper surface 22 direction of a light guide plate 2 each slots 41 and 42 and .. although formed mostly at equal intervals, the interval of 45 keeps away from the light source 3 in order to make the optimal luminance distribution on the upper surface 22 of a light guide plate according to a kind, an arrangement position, etc. of the light source 3 -- it can also constitute so that it is alike, and it may follow and an interval may change gradually (for example, reduction or an increase) each slots 41 and 42 and .. as for 45, it is desirable to form the minute unevenness for heightening an optical spreading effect in the front face, for example, such minute unevenness can be formed by forming a slot using dicing equipment etc. And it is made only for an air space to exist all over a slot 4 without preparing other materials, in order to plan the simplification and the optical spreading effect of composition.

[0007] lines, such as composition using the point light source like Light Emitting Diode two or more although the light source 3 arranged to the anterior side 21 of a light guide plate 2 can also be considered as the composition using the one point light source like Light Emitting Diode, or a cold cathode tube, -- considering as the composition using the light source is desirable when attaining brightness equalization on the upper surface 22 of a light guide plate

[0008] In the above-mentioned composition, if the light source 3 lights up, the light which it was emitted from the light source 3 and carried out incidence to the light guide plate 2 reaches the upper surface 22, an inferior surface of tongue 23, and the side directly, it will be reflected there or the part will carry out outgoing radiation of it out of a light guide plate 2. a part of light which carried out incidence to the light guide plate 2 -- the light source 3 -- most near -- the shallowest slot 41, the slot 42 shallow to the degree of the back, and .. from the light source 3 directly to the long distance trench 45 of No. 1 most Or since it reaches indirectly, the part is reflected up one by one as an arrow shows, and outgoing radiation is carried out out of a light guide plate 2 from the upper surface 22, the light which carried out incidence to the light guide plate 2 can be efficiently led to the upper surface 22 of a light guide plate 2, and the upper surface brightness of a light guide plate 2 can be raised.

[0009] Although it decreases as the quantity of light of the light source 3 which arrives at a slot 4 has many sides near the light source 3 and keeps away from the light source here since the it is alike, and follow, increase the depth of slot 4, and according to slot 4 reflector product which keeps away from the light source 3 is increased -- each slots 41 and 42 and .. the total amount of reflected lights by 45 can be equalized mostly, and the brightness of the upper surface of a light guide plate 2 can be made to equalize Moreover, since the light reflected by the slot 4 and the light which passed through the slot 4 are uniformly diffused by existence of unevenness of slot 4 front face and the air space in a slot 4 etc., it can make the brightness on the upper surface 22 of a light guide plate equalize more.

[0010] In addition, although the above-mentioned example illustrated the case where two or more slots 4 were formed in the inferior surface of tongue 23 of a light guide plate 2, as shown in drawing 2 , it can also form two or more slots 4 in the upper surface 22 of a light guide plate 2 like ****. moreover, the upper surface 22 of the light guide plate 2 shown in drawing 1 -- each slots 41 and 42 of an inferior surface of tongue 23, and .. the depth can also form in the vertical side of a light guide plate 2 two or more slots which keep away from the light source 3 and which are alike, follow and increase gradually by forming two or more slots 4 which have 45 and a predetermined relation and were formed in the light guide plate inferior surface of tongue 23 of drawing 2 Moreover, you may prepare the reflective member which raises a light reflex function if needed in the inferior surface of tongue 23 and the side of a light guide plate 2.

[0011]

[Effect of the Invention] By using the easy composition which increases as two or more slots are formed in the upper surface or the inferior surface of tongue of a light guide plate and this depth of flute keeps away from the light source according to this invention as mentioned above, the light which carried out incidence to the light guide plate can be efficiently led to the upper surface of a light guide plate, and the upper surface brightness of a light guide plate can be raised.

[Translation done.]